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Financial Crisis Inquiry Commission

Preliminary Staff Report

SECURITIZATION AND THE MORTGAGE CRISIS

APRIL 7, 2010

This preliminary staff report is submitted to the Financial Crisis Inquiry Commission (FCIC) and the public for information, review, and comment. Comments can be submitted through the FCIC's website, www.fcic.gov.

This document has not been approved by the Commission.

The report provides background factual information to the Commission on subject matters that are the focus of the FCIC's public hearings on April 7, 8, and 9, 2010. In particular, this report provides information on mortgage securitization and the mortgage markets. Staff will provide investigative findings as well as additional information on these subject matters to the Commission over the course of the FCIC's tenure.

Deadline for Comment: May 15, 2010

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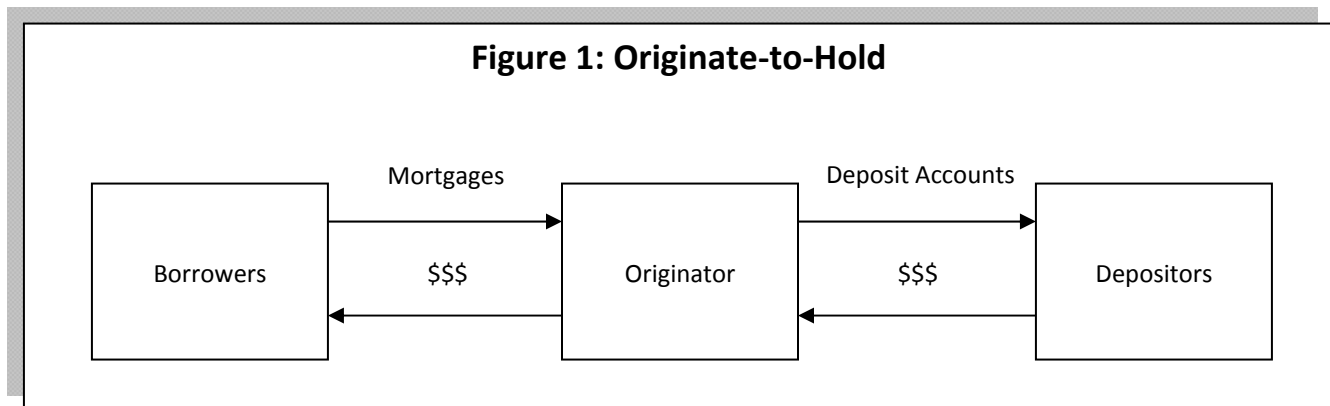
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Securitization and the Mortgage Crisis

The purpose of this preliminary staff report is to provide an overview of mortgage securitization and its possible role in the sharp increase in mortgage defaults that precipitated the financial crisis. Section I describes the growth and basic mechanics of the mortgage securitization system. Section II discusses the way in which securitization could have contributed to the recent increase in mortgage defaults and foreclosures. Those researching the financial crisis disagree on the extent to which securitization resulted in an increase in defaults, and empirical research on this issue is ongoing.

I. THE SECURITIZATION OF RESIDENTIAL MORTGAGES

In the decades leading up to the early 1970s, the housing finance system was relatively simple: banks and savings and loan associations made mortgage loans to households—an activity referred to as *origination*—and held them until they were repaid. Deposits provided the major source of funding for these lenders, as most were depository institutions. Figure 1 illustrates this traditional “originate-to-hold” model which, along with the fragmented nature of the banking sector, resulted in a highly localized mortgage market with regional variation in the availability of residential mortgage credit.



In the 1970s, the housing finance system began to shift from depository-based funding to capital markets-based funding. By 1998, 64 percent of originated mortgage loans were sold by originators to large financial institutions that package bundles of mortgages and sell the right to receive borrowers’ payments of principal and interest directly to investors.¹ These investors in the capital markets now provide the majority of funding for the housing finance system.

¹ See Figure 4, *infra*.

A. THE ORIGINS OF MORTGAGE SECURITIZATION: THE GSEs

Key to this shift to capital markets-based funding of mortgage lending were Fannie Mae and Freddie Mac, the government sponsored enterprises (GSEs), which were created by the federal government to develop the secondary mortgage market. They did this in two ways: (1) by issuing debt to raise capital and using those funds to purchase mortgages to hold in their portfolios; and (2) by *securitizing* mortgages, that is, by selling to investors the rights to the principal and interest payments made by borrowers on pools of mortgages.

In the securitization process, Fannie Mae and Freddie Mac buy pools of mortgages from originators, which include both depository institutions and non-depository mortgage lenders. In order to be eligible to sell loans to Fannie Mae or Freddie Mac, the originator must agree to abide by the GSEs' underwriting guidelines, which specify types of loans each GSE will buy as well as processes for verifying the creditworthiness of borrowers. Fannie Mae and Freddie Mac then bundle together particular pools of mortgages and sell the cash flow rights of the pools to investors as mortgage backed securities (MBS). Holders of an MBS have the right to receive the principal and interest payments made by mortgage borrowers in the underlying pool, which is held by a trust on behalf of MBS investors. Ginnie Mae plays a similar role in the secondary market for mortgages insured by the Federal Housing Administration and the Department of Veterans Affairs, and MBS issued by the GSEs and Ginnie Mae are referred to as *agency MBS*.

Importantly, Fannie Mae and Freddie Mac provide a *guarantee* that investors in their MBS will receive timely payments of principal and interest. If the borrower for one of the underlying mortgages fails to make his payments, the GSE that issued the MBS will pay to the trust the scheduled principal and interest payments. In return for providing this guarantee, Fannie Mae and Freddie Mac deduct an ongoing *guarantee fee*, which is charged by setting the pass-through annual interest rate (i.e., the interest rate received by holders of the MBS) about 20 - 25 basis points (i.e., 0.20 - 0.25 percentage points) below the weighted average interest rate of the mortgages in the pool.² Because the GSEs were perceived to be implicitly backed by the federal government, their guarantee was perceived by investors to have essentially removed the credit risk from their MBS.³

² The average annual guarantee fee or "g-fee" was 22 basis points in 2007 and was raised to 25 basis points in 2008. See FCIC Preliminary Staff Report, "Government Sponsored Enterprises and the Financial Crisis."

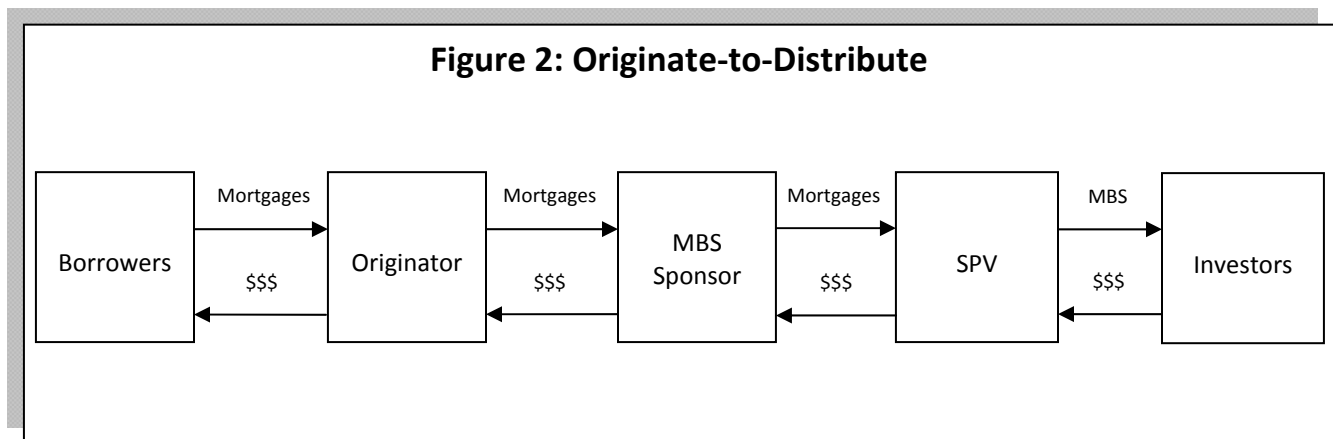
³ Bhattacharya, et al (2006, p. 30).

B. NON-AGENCY SECURITIZATION

Other financial institutions besides the GSEs would also buy mortgages, bundle them into pools, and issue MBS. These *non-agency* securitizations played a large role in the subprime, alt-A, and jumbo markets in the 2000s.⁴

1. *The mechanics of non-agency MBS securitization*

In a non-agency securitization, the *sponsor* of the securitization, which could be an investment bank, commercial bank, thrift, or mortgage bank, first acquired a set of mortgages, either by originating them or by buying them from an originator. It then would create a new entity, referred to as a *special purpose vehicle* (SPV), and transfer the mortgages to the SPV. Figure 2 illustrates this “originate-to-distribute” model of housing finance.



The principal and interest payments on the pool of mortgages would provide the underlying set of cash flows for the SPV. The SPV could then enter into contracts in order to manage the risk it faced. For example, to reduce interest rate-related risks, the SPV could enter into interest rate swap agreements that provided floating interest rate-based payments to the SPV in exchange for a fixed set of payments from the SPV.

The SPV then would issue various classes of mortgage-backed securities that gave investors who were holders of the securities rights to the cash flows available to the SPV. Each class of securities was referred to as a *tranche*. Unlike agency MBS, these securities were typically not explicitly guaranteed against credit loss. A crucial goal of the capital structure of the SPV was to create some tranches that were deemed low risk and could receive the highest

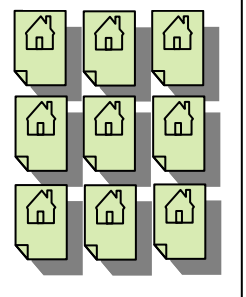
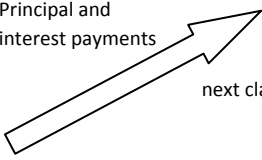
⁴ As discussed in the FCIC Preliminary Staff Report, “The Mortgage Crisis,” subprime loans are loans that are made to borrowers with poor credit scores. Alt-A loans are made with higher loan-to-value ratios or less documentation than is required for loans that are not alt-A.

investment-grade ratings, such as AAA, from the rating agencies. This was done using a set of *credit enhancements*, ways of structuring the MBS so that some of its tranches received high credit ratings.

One key credit-enhancement tool was *subordination*. The classes of securities issued by the SPV were ordered according to their priority in receiving distributions from the SPV. The structure was set up to operate like a waterfall, with the holders of the more senior tranches being paid prior to the more junior (or subordinate) tranches. The most senior set of tranches—referred to simply as *senior securities*—represented the lowest risk and consequently paid the lowest interest rate. They were set up to be paid prior to any of the classes below and were typically rated AAA. Senior securities typically made up the majority of bonds issued by the SPV. The next most senior tranches were the *mezzanine* tranches. These carried higher risk and paid a correspondingly higher interest rate. The most junior tranche in the structure was called the *equity* or *residual* tranche and was set up to receive whatever cash flow was left over after all other tranches had been paid. These tranches, which were typically not rated, suffered the first losses on any defaults of mortgages in the pool.

Table 1 provides a notional balance sheet for a typical MBS SPV. The entity holds a pool of mortgages as assets. The payments of principal and interest by borrowers flow first to make the promised payments to the AAA senior bondholders, then down to pay the AA bonds, and so forth. If there is any money left over after all bondholders have been paid, it flows to the residual tranche of securities. The AAA senior bonds make up 92 percent of the principal amount of debt issued by the SPV, AA bonds account for 3 percent, mezzanine BBB bonds make up 4 percent, and the residual tranche amounts to 1 percent.

Zimmerman (2006, p.109) gives an example of a typical subprime MBS in which cumulative losses on mortgages in the SPV were expected to amount to 4 percent of the total principal amount. If the MBS does indeed experience such a 4 percent loss on its mortgage assets, then 4 percent of the total principal amount on its bonds would default. Because of the SPV's subordination structure, these losses would first be applied to the residual tranche. The residual tranche, which accounts for 1 percent of the principal amount of the SPV's bonds, would fully default, paying nothing. That leaves 3 percent more of the total principal amount in losses to apply to the next most junior tranche, the mezzanine BBB tranche. Since the mezzanine BBB tranche totals 4 percent of the deal, the 3 percent left in losses would reduce its actual payments to 1 percent, meaning that 75 percent of the BBB bonds' principal value would be lost. The AA and AAA bonds, however, would pay their holders in full. In our simple example, the junior tranches below the AA and AAA bonds are large enough to fully absorb the expected loss on the SPV's mortgages.

Table 1: Balance Sheet of an MBS	
Assets	Liabilities
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <p style="text-align: center;">Mortgages</p>  </div> <p style="margin-left: 20px;">Principal and interest payments</p>  <p style="margin-left: 100px;">first claim...</p> <p style="margin-left: 100px;">next claim...</p> <p style="margin-left: 100px;">next claim...</p> <p style="margin-left: 100px;">last</p>	<p>AAA senior bonds 92%</p> <hr/> <p>AA bonds 3%</p> <hr/> <p>Mezzanine BBB bonds 4%</p> <hr/> <p>Residual tranche 1%</p>

Another credit enhancement technique was *over-collateralization*. The principal balance of the underlying mortgages would often exceed the principal balance on all of the debt securities issued by the SPV. Thus, some of the underlying mortgages could default, resulting in loss of principal on the mortgage, without any of the MBS bonds defaulting on their promised payments to investors.

Similarly, the weighted average coupon interest rate on the underlying mortgage pool would typically exceed the weighted average coupon interest rate paid on the SPV's debt securities by an amount sufficient to provide a further buffer before the debt tranches incur losses. In essence, the SPV received a higher interest rate from mortgage borrowers than it paid to investors in its bonds. The resulting *excess spread* gave the SPV extra cash flow to pay its bond holders, further insulating the MBS from credit risk in the underlying mortgages.

With both over-collateralization and excess spread, the total amount of cash that had been promised to be paid *to* the SPV by mortgage borrowers was greater than the total amount of cash that the SPV had promised to pay *out* to investors. This gave the SPV a cushion in case some of the mortgage borrowers defaulted on their promised payments.

The prospectus for an MBS would include a description of the mortgages held by the SPV, such as information about the distribution of borrowers' credit scores and loan-to-value ratios, and the geographic distribution of the homes that serve as collateral for the mortgages. The underwriting practices used by the originators usually would also be described. For example, Goldman Sachs disclosed the following about the underwriting

standards used by the originator—New Century Mortgage—of the mortgages it packaged in a 2006 MBS offering:⁵

The mortgage loans will have been originated in accordance with the underwriting guidelines established by New Century. On a case-by-case basis, exceptions to the New Century Underwriting Guidelines are made where compensating factors exist. It is expected that a substantial portion of the mortgage loans will represent these exceptions. ... All of the mortgage loans were also underwritten with a view toward the resale of the mortgage loans in the secondary mortgage market. ... As a result of New Century's underwriting criteria, changes in the values of [homes securing the mortgage loans] may have a greater effect on the delinquency, foreclosure and loss experience on the mortgage loans than these changes would be expected to have on mortgage loans that are originated in a more traditional manner.

The originators of the mortgages also generally made representations and warranties to the SPV, described in the prospectus, regarding the nature of the mortgages in the pool. For example, they typically represented that the mortgages had never been delinquent and that they complied with all national and state laws in their origination practices. Moreover, in the event that any of the representations and warranties were breached, or if any of the mortgages defaulted early (within some fixed period after being transferred to the SPV), the originator typically agreed to repurchase the mortgage from the SPV.

The SPV would contract with a firm to *service* the mortgages in the pool, i.e., to collect payments from borrowers. The mortgage servicer would also handle defaults in the mortgage pool, including negotiating modifications and settlements with the borrowers and initiating foreclosure proceedings. In exchange, the mortgage servicer would get an ongoing *servicing fee* from the flow of interest payments from borrowers of typically between 25 and 50 basis points, or 0.25 and 0.50 percentage points, at an annual rate. Servicers also typically would retain late fees charged to delinquent borrowers and would be reimbursed for expenses related to foreclosing on a loan. The borrowers would be informed by the originator or the new servicer when servicing rights to their mortgages were transferred so that they knew how to make payments to the new servicer.

2. *Credit ratings for MBS*

The sponsor of an MBS typically approached Fitch, Standard & Poor's, or Moody's to obtain credit ratings on the classes of debt securities issued in the deal. The credit rating agencies analyzed the probability distribution of cash flows associated with each tranche using proprietary models based on historical data and assigned a credit rating to each debt tranche. These ratings were intended to represent the riskiness of the securities and were used by investors to inform their decision whether to invest in the security. Sponsors of MBS typically structured them to produce as many bonds with the highest credit rating—

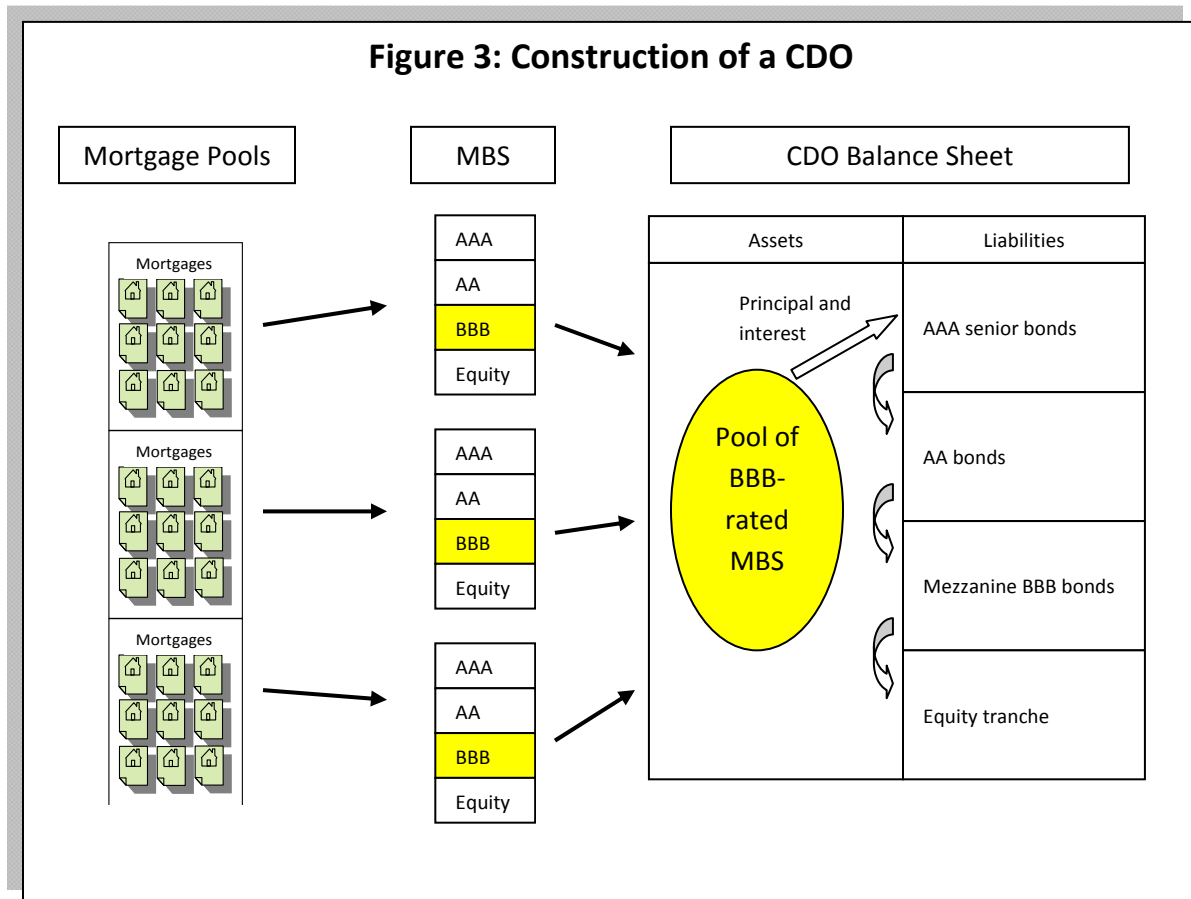
⁵ Prospectus for Mortgage Pass-through Certificates, Series 2006-NC2, available at http://www.sec.gov/Archives/edgar/data/1366182/000112528206003776/b413822_424b.txt

AAA, for example—while offering attractive yields. AAA-rated bonds were in demand by investors who required low-risk assets in their portfolio. The internal credit enhancements used in non-agency securitizations, discussed above, enabled the transformation of mortgages, including relatively risky mortgages to borrowers with low credit scores or with little equity, into bonds that were considered to be low risk but relatively high yield.

3. Collateralized debt obligations and credit default swaps

The junior tranches of an MBS typically received lower ratings from the rating agencies because they were more likely to default than the senior tranches. This is because, as discussed above, senior securities would be paid before the junior securities would be paid, so that the more junior a tranche would be, the more likely it would be to bear losses if the underlying mortgages defaulted.

The same credit-enhancement techniques that produced highly rated tranches out of a pool of mortgages were used to create highly rated securities out of pools of junior tranches of MBS. This was done using a product known as a *collateralized debt obligation* (CDO). Figure 3 depicts the construction of a CDO created from mortgages.

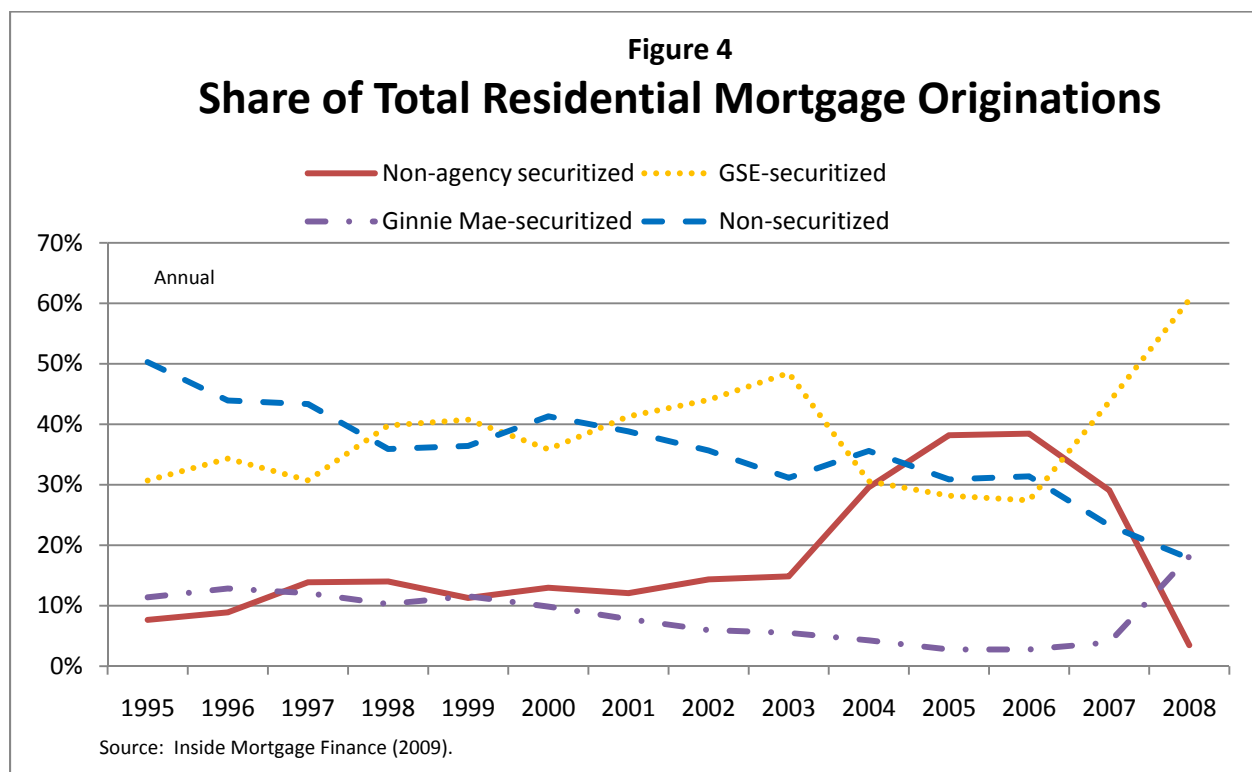


The sponsor of such a CDO assembled a pool of junior tranches from many different MBS, for example *mezzanine* tranches rated BBB, transferred them to an SPV, and using the same tools of subordination, over-collateralization, and excess spreads issued AAA-rated senior securities from that SPV, along with junior tranches and a first-loss residual tranche.

Credit default swaps (CDS) were used to protect against the risk of an MBS defaulting. In a CDS, the buyer would agree to pay the seller a fixed stream of payments. In return, the seller would agree to pay the buyer some fixed amount if the “reference entity” of the CDS experienced a “credit event,” which was typically some sort of default. For MBS- and CDO-based CDSs, the reference entity was the trust that issued a particular MBS or CDO security. CDS were used by holders of MBS and CDOs for the purpose of reducing their exposure to credit risk of MBS and CDOs.⁶

C. RISE OF NON-AGENCY SECURITIZATION

The 2000s saw a large increase in the market share of non-agency securitization. Figure 4 shows the fraction of total residential mortgage originations in each year that were securitized into non-agency MBS, GSE MBS, and Ginnie Mae MBS, as well as the fraction non-securitized (i.e., held as whole loans by banks, thrifts, the GSEs, and other institutions).



⁶ Moreover, CDSs were used to generate *synthetic CDOs*, which have similar cash flow properties as the *cash CDOs* described above without actually holding any MBS bonds. Gorton (2008, p. 42).

Four trends are notable. Non-securitized mortgage originations declined steadily from half the market in 1995 to under 20 percent in 2008. Non-agency MBS hovered between 8 and 12 percent until 2003; Non-agency MBS then more than trebled in market share to a peak of 38 percent in 2006. During the growth years for non-agency MBS, Ginnie Mae's market share dropped considerably. Finally, both GSEs and Ginnie Mae rapidly escalated their market share as non-agency securitization dropped in 2008.

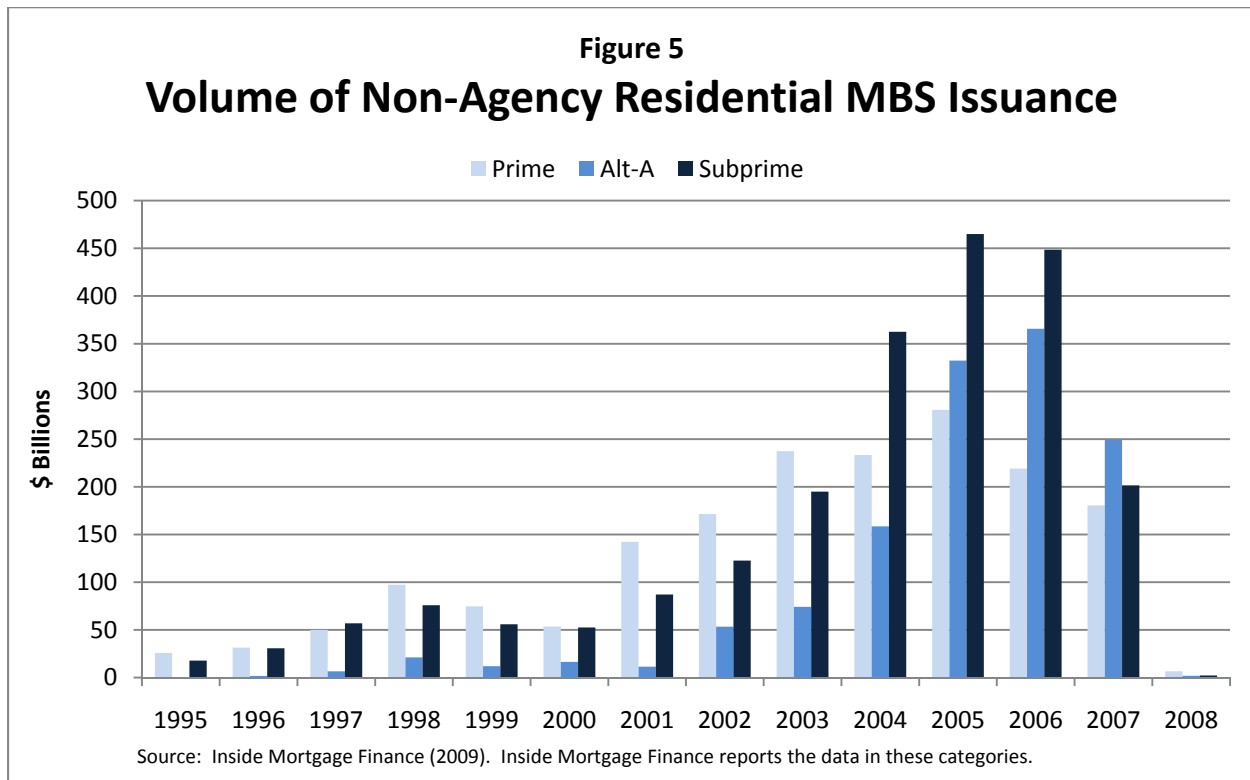
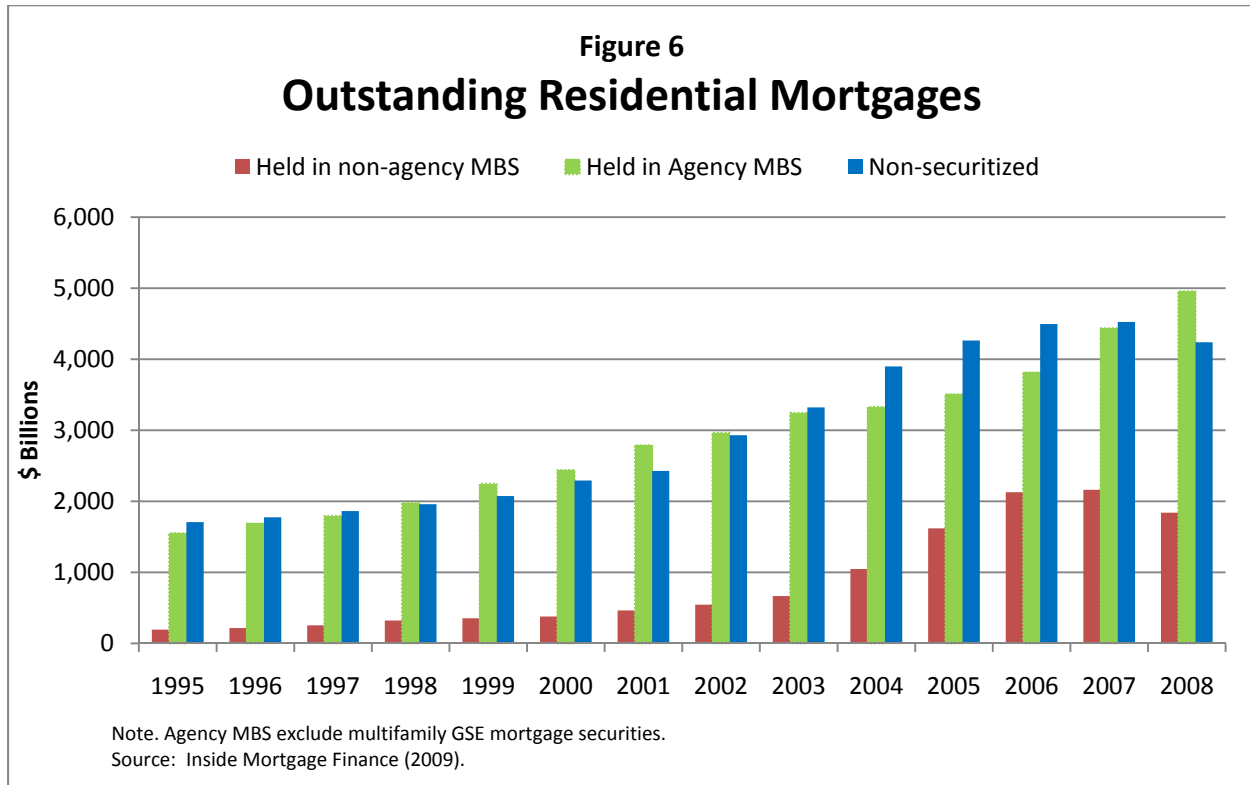


Figure 5 plots the volume of prime, subprime, and alt-A (self-identified as such by the sponsors) non-agency MBS issued from 1995-2008. Early in the period, the prime non-agency MBS, which contained largely jumbo mortgages, were the biggest of the three types of non-agency MBS. But, by 2006 the subprime and alt-A non-agency MBS had each surpassed prime non-agency MBS in volume. In particular, subprime non-agency MBS showed a dramatic increase from 2003 to 2005. Alt-A non-agency MBS saw its largest jump in volume in 2005. Notably, the non-agency MBS market was nearly nonexistent in 2008. The preliminary staff report titled “Government Sponsored Enterprises and the Financial Crisis,” released on April 9, 2010, shows details on the GSEs’ total book of business, including MBS and portfolio loans broken down by prime, subprime, and alt-A.



Another way to see the dramatic growth of securitization, and in particular the recent growth of the non-agency MBS market, is to examine the amount of outstanding mortgages held in MBS. Figure 6 shows the dollar amount of outstanding mortgages that are held in agency MBS and non-agency MBS, as well as the amount of non-securitized mortgages outstanding. The amount of all outstanding mortgages held in non-agency MBS rose notably from only \$670 billion 2004 to over \$2,000 billion in 2006. By 2008, the amount held in non-agency MBS began to decline. With current issuance of non-agency MBS well below pre-crisis levels, the amount of outstanding mortgages held in non-agency MBS will continue to decline as mortgages in these pools either pay off or go into default.

Table 2: Top Non-Agency MBS Sponsors in 2007.

1. Countrywide Financial*
2. Lehman Brothers†
3. Wells Fargo & Co.
4. Washington Mutual†
5. Bear Stearns*
6. JPMorgan Chase
7. Deutsche Bank
8. Residential Funding Corp.
9. Merrill Lynch*
10. Morgan Stanley
11. IndyMac†
12. Goldman Sachs
13. Citigroup
14. Bank of America Corp.
15. RBS Greenwich Capital
16. Option One*
17. Credit Suisse
18. Barclays
19. UBS Warburg
20. American Home Mortgage†
21. CIT Group†
22. Ameriquest Mortgage*
23. HSBC
24. Thornburg Mortgage†
25. Nomura

Notes:

* denotes firms that have subsequently been acquired.

† denotes firms that have subsequently declared bankruptcy or been placed into conservatorship.

‡ denotes firms that have subsequently been shut down by parent company.

Source: Inside Mortgage Finance (2009).

Table 2 provides a list of the top 25 non-agency MBS sponsors in 2007. The top 10 sponsors alone accounted for 56 percent of non-agency MBS issuance.⁷ Note that some sponsors principally used mortgages that they or an affiliate originated,⁸ whereas other sponsors

⁷ Inside Mortgage Finance (2009, Vol. II p. 19).

⁸ See, e.g., Prospectus for Washington Mutual Mortgage Pass-Through Certificates, Series 2003-R1, at http://www.sec.gov/Archives/edgar/data/826219/000112528203005824/b327705_424b5.txt, in which Washington Mutual is both the sponsor and the originator.

purchased mortgages originated by different lenders.⁹ In 2007, investment banks sponsored 41 percent of non-agency MBS, commercial banks and thrifts sponsored 28 percent, and mortgage banks sponsored 12 percent.¹⁰ It is important to note that sponsor rankings reflect market shares that fluctuate as business conditions evolve. Consequently, a firm may occupy various rank positions throughout any particular year.

The ultimate destinations of MBS included depository institutions, pension funds, investment banks, and foreign investors. Figure 7 shows the holders of agency MBS according to the Federal Reserve Board's data. Unfortunately, the data only allow one to identify the amount of agency MBS held by savings institutions and U.S. commercial banks, not other types of institutions. By 2008, these depository institutions held over \$1 trillion of the approximately \$5 trillion in outstanding agency MBS.

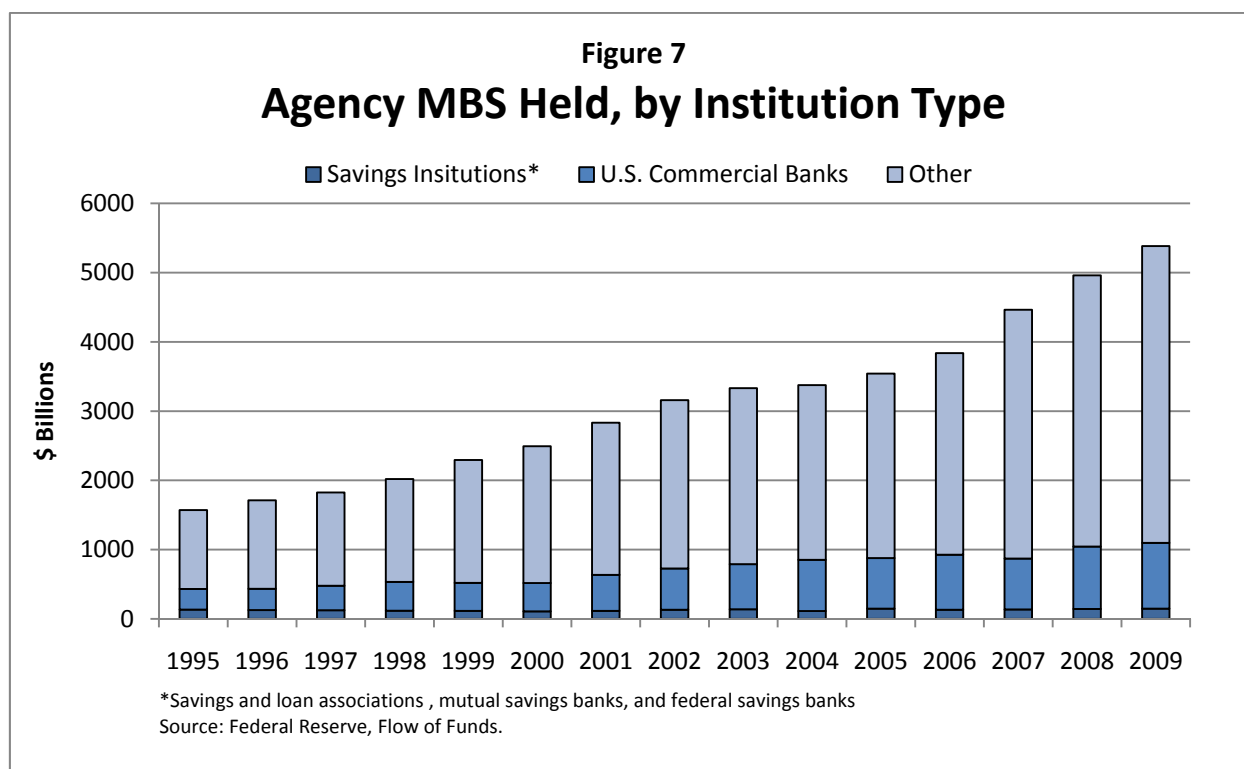
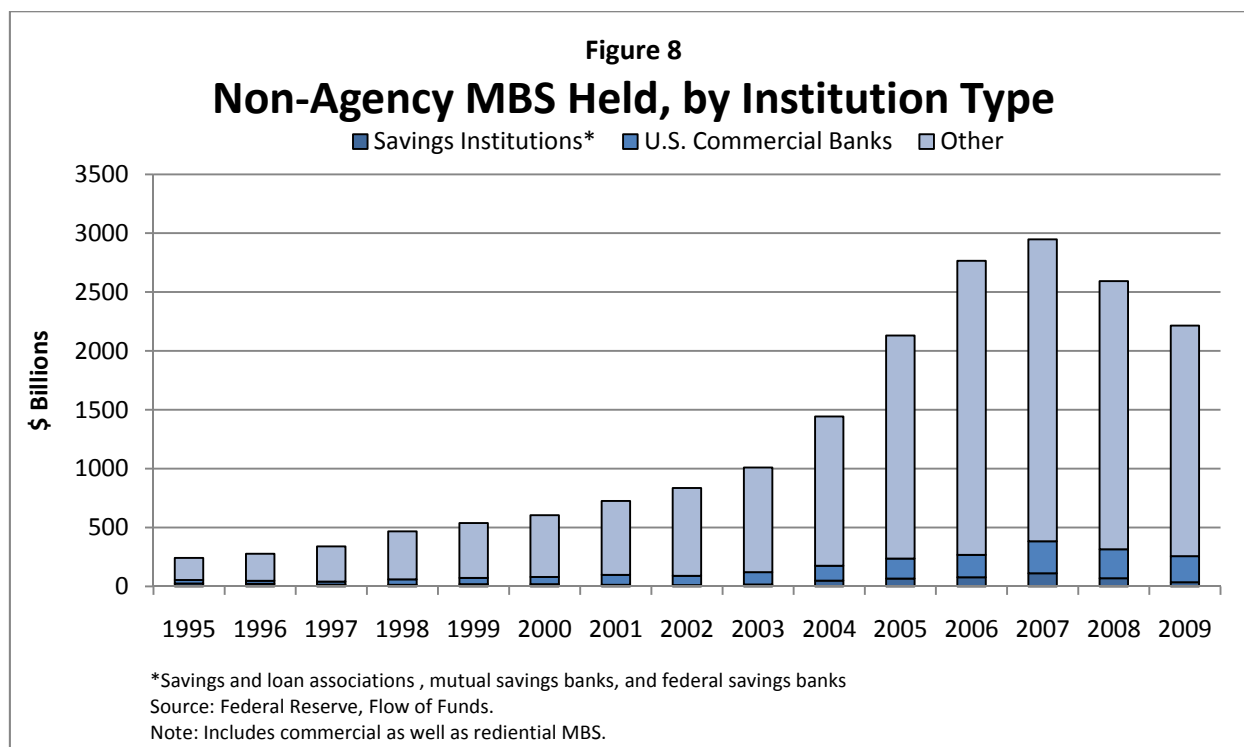


Figure 8 similarly shows the amount of non-agency MBS—including both residential MBS and MBS containing commercial mortgages (i.e., loans to businesses)—held by commercial banks, savings institutions, and other types of investors. Commercial banks and savings institutions hold a relatively small amount of non-agency MBS, much less than their holdings

⁹ See, e.g., Prospectus for Mortgage Pass-through Certificates, Series 2006-NC2, available at http://www.sec.gov/Archives/edgar/data/1366182/000112528206003776/b413822_424b.txt, in which Goldman Sachs is the sponsor for an MBS backed by mortgages originated by New Century.

¹⁰ Inside Mortgage Finance (2009, Vol II p. 14)

of whole mortgage loans. For example, in 2007 commercial banks held \$3.564 trillion in whole mortgages, compared to only \$272 billion in non-agency MBS.¹¹



A Lehman Brothers research report provides further detail on who held non-agency residential MBS.¹² Of the \$1.8 trillion in non-agency residential MBS that Lehman estimates was outstanding as of June 2007, nearly \$1.5 trillion were AAA-rated senior securities. Figure 9 below provides a breakdown of which types of institutions held these AAA-rated securities. In addition to the nearly \$1.5 trillion in AAA-rated senior securities, Lehman estimates that \$240 billion in investment-grade junior MBS were then outstanding. The majority of this, \$180 billion, was held in CDOs. Those CDOs were in turn held by a range of financial institutions.

¹¹ Inside Mortgage Finance (2009).

¹² Lehman Brothers, Fixed Income U.S. Securitized Products Research, "Who Owns Residential Credit Risk," Sept. 7, 2007.

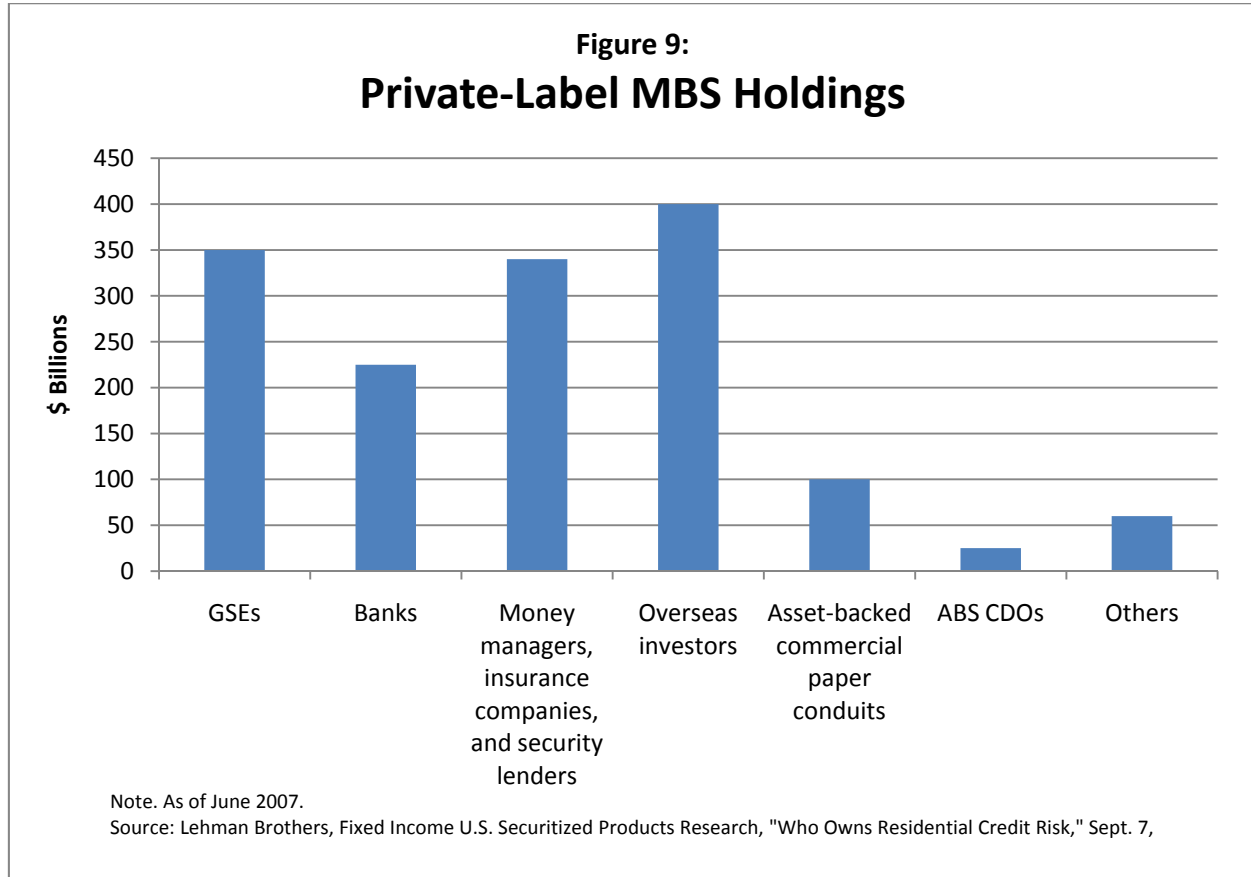


Table 3 below provides the top 25 GSE, bank, and thrift investors in non-agency MBS as of 2007. The bank and thrift institutions in the top 50 holders of non-agency MBS together held \$314 billion in non-agency MBS in 2007. In contrast, Fannie Mae and Freddie Mac together held \$345 billion in non-agency MBS in 2007.¹³

¹³Inside Mortgage Finance (2009).

Table 3: Top GSE, Bank, and Thrift Holders of Non-Agency MBS as of 2007.

1. Freddie Mac[†]
2. Fannie Mae[†]
3. Citigroup Inc.
4. ING Bank
5. Bank of New York Mellon Corp.
6. FHLBank San Francisco
7. Washington Mutual[†]
8. Bank of America Corp
9. Wachovia Corp.*
10. Wells Fargo & Co.
11. FHLBank Atlanta
12. Countrywide Bank, FSB*
13. State Street Corp.
14. FHLBank Pittsburgh
15. IndyMac Bank, FSB[†]
16. FHLBank Indianapolis
17. FHLBank Boston
18. Capital One Financial Corp.
19. FHLBank Seattle
20. Commerce Bancorp*
21. FHLBank Chicago
22. U.S. Bancorp
23. Citizens Financial Group
24. M&T Bank Corp.
25. JPMorgan Chase

Notes:

* denotes firms that have subsequently been acquired.

† denotes firms that have subsequently declared bankruptcy or been placed into conservatorship.

Source: Inside Mortgage Finance (2009).

However, determining which institutions actually held the credit risk of non-agency MBS and CDOs is complicated because of the many complex contracts that these institutions hold related to these securities, including credit default swaps. Moreover, the CDOs which hold junior tranches of non-agency MBS offered further credit enhancements, resulting in an even more complicated chain of contracts and structures linking the credit risk of the underlying mortgages to the ultimate holders of that credit risk.

D. BENEFITS OF SECURITIZATION

A principal economic benefit of securitization was that it expanded the ways in which mortgages could be funded. With the active secondary market provided by securitization, originators could either hold a loan in portfolio, funding it with their standard sources of debt and equity capital, or sell it on to be securitized, so that it is funded directly by the capital markets as a bond. It may thereby have resulted in a lower cost of credit for mortgage financing, resulting in an expansion in mortgage lending. Moreover, banks held MBS in their portfolio, which had the advantage of being much more liquid than whole loans.¹⁴ Securitization was also thought to have been beneficial by allowing the risks associated with mortgage lending to be more broadly dispersed and to be borne by investors best-equipped to bear it.¹⁵

In addition to these potential economic benefits, holding AAA-rated MBS instead of whole mortgages allowed depository institutions to lower their regulatory capital requirements. Depository institutions are required by regulators to hold a certain amount of equity capital as a cushion in case they suffer losses on their risky assets. If they hold riskier assets, they are required to hold more capital. Because capital accounting rules deemed AAA-rated MBS less risky than whole mortgages, depository institutions were able to lower the amount of capital they held by owning MBS rather than whole mortgages. This may have provided an important motivation for depository institutions to hold MBS instead of the mortgages they originated.

II. SECURITIZATION AND THE MORTGAGE CRISIS

In the wake of the sharp increase in defaults that precipitated the financial crisis, policymakers and researchers have questioned whether agency and non-agency securitization and the originate-to-distribute model of mortgage lending led to riskier loans being originated. This section discusses how the increase in securitization may have been relevant to the increase in mortgage defaults and thereby contributed to the financial crisis.

In addition to increasing defaults, securitization may have played a role in the financial crisis by making the financial system more fragile and sensitive to an increase in mortgage defaults.¹⁶ This and other potential roles of securitization in the financial crisis will be discussed in future staff reports.

¹⁴ For evidence on the economic benefits of securitization, see Kashyap and Stein (2000) and Loutskina and Strahan (2009).

¹⁵ See, e.g., Alan Greenspan, Remarks Before the Council on Foreign Relations, Nov. 19, 2002, at <http://www.federalreserve.gov/BoardDocs/Speeches/2002/20021119/default.htm>.

¹⁶ See, e.g., Gorton (2008) and Gorton and Metrick (2009).

A. MORAL HAZARD

One way that securitization may have led to riskier mortgages is through incentive problems caused when originators sell loans. When originators sell off loans they originate, they may have weaker incentives to carefully screen mortgage borrowers. In the originate-to-hold model of mortgage lending, the originator bears the loss if it originates a mortgage that goes bad. This gives the originator strong incentives to gather information about the borrower's creditworthiness and the value of the home that serves as collateral. If instead the originator plans to sell the loan, it does not bear any loss if the borrower fails to repay. Hence the originator may have little incentive to scrutinize appraisals and the borrower's capacity to repay. This incentive problem is referred to as a *moral hazard* problem. A related incentive problem occurs when originators have better information than secondary market purchasers about the quality of the mortgages they have already originated and are considering selling. The originator may have an incentive to sell the worst loans in its portfolio, and retain the best loans with the lowest default risk. This is referred to as an *adverse selection* problem.

In markets in which such incentive problems result in lower quality assets for sale, purchasers may demand a lower price for the assets that reflects their lower quality. For example, in the used car market, the sellers of cars have better information about their car's quality than do the buyers. Because of this, buyers worry that the car being sold is of low quality—a "lemon"—and this concern about quality lowers the price they are willing to pay.

However, ultimate investors in MBS may not have fully understood these incentive problems. Thus the increased default risk of securitized mortgages may not have been priced in the market. Furthermore, credit rating agencies, whose ratings investors relied on, may not have fully understood these problems, and the rating agencies' models may well have failed to take into account the moral hazard and adverse selection problems.¹⁷ If true, then securitization may have caused a deterioration of mortgage underwriting practices that resulted in more high-risk mortgages being originated, and consequently a greater number of defaults when the housing bubble burst.

However, there are indications that market participants understood the incentive problems posed by securitization and took steps to mitigate them. Fannie Mae and Freddie Mac, for example, both publish extensive underwriting guidelines that originators are required to follow. Prior to 1982, both employed staff underwriters to "re-underwrite" every mortgage they purchased to verify the originator's judgments about the borrower's creditworthiness and collateral. Since 1982, both have performed audits of a random sample of loans—called a *postfunding review*—to verify the originator's underwriting. The purpose of these practices is to ensure the credit quality of the loans they purchase.

¹⁷ See Coval, Jurek, and Stafford (2009) for an account of the credit rating agencies' mistakes in evaluating the default risk of MBS and MBS derivatives.

Similarly, MBS sponsors sometimes required originators to offer a *random* selection of loans on their books, which dampened their ability to adversely select higher risk loans to sell. Furthermore, MBS sponsors typically required originators to make representations and warranties as to their underwriting practices and to repurchase loans for which they breach those representations and warranties or that default soon after sale, and efforts were made routinely to enforce these provisions.

Moreover, originators could retain some credit risk by keeping whole loans or tranches of MBS on their balance sheets, which would help to maintain their incentives to screen. Indeed, originators as well as MBS sponsors have suffered billions of dollars in losses from the increase in mortgage defaults. Similarly, some originators retained servicing rights, which also helped to maintain a link between the originator's compensation and the performance of its loans.

Finally, there are a number of ways that investors could independently determine the risk profile of an MBS, which mitigated the moral hazard problem. The emergence of the use of credit scores in mortgage underwriting made default risk far more transparent to secondary market participants. If credit scores were not available for a non-agency MBS, many investors would not consider it. Other important predictors of default that are in principle verifiable by secondary market purchasers are loan-to-value ratios and the borrower's income.

Ultimately, the extent to which the originate-to-distribute model resulted in a moral hazard problem that led to riskier loans being originated is an open empirical question.

B. EXPANSION OF CREDIT SUPPLY

Another means by which securitization could have resulted in lenders making loans to riskier borrowers was simply by generally expanding the supply of credit. When originators could securitize their loans, they had a new source of finance for loan origination. The result could have been a reduction in the cost of credit that led to a credit expansion. With lower borrowing costs, households will on average borrow more. Moreover, the lower cost of credit may have made lending to riskier borrowers profitable, resulting in more subprime lending.¹⁸

Furthermore, the expansion of credit brought about by securitization may have resulted in an increase in house prices. From 2002 to 2006, housing prices appreciated rapidly, and then in 2006 began to decline.¹⁹ Many economists view this run-up in house prices as an asset bubble. The subsequent decline in housing prices beginning in 2006 resulted in a sharp increase in mortgage defaults. If the expansion of credit caused by securitization

¹⁸ Mian and Sufi (2009).

¹⁹ The FCIC's Preliminary Staff Report, "The Mortgage Crisis," April 7, 2010, presents data on housing prices leading up to and during the mortgage crisis.

contributed to the bubble in the housing market, it may thereby have indirectly contributed to the sharp rise in defaults when that bubble burst.

C. FRICTIONS IN MODIFYING DELINQUENT MORTGAGES

In addition to potentially resulting in riskier mortgage loans being originated, securitization may have increased the probability that a defaulting mortgage went into foreclosure. When an originator retains and services a mortgage and the borrower defaults, the originator can decide whether to foreclose and sell the home, which is costly and can depress the value of the home, or instead to negotiate a modification to the terms of the loan that results in the borrower beginning to once again pay on the mortgage. In contrast, when a loan is securitized, investors in the MBS hold the rights to most of the cash flows generated by the loan, and a separate entity—the servicer—is responsible for negotiating with the borrower if the loan is in default. The servicer may not have the same incentives to negotiate a loan modification as a portfolio lender would, and hence may foreclose on loans for which the efficient outcome is a modification. For example, servicers are typically reimbursed for their expenses in foreclosing on a mortgage, but are not reimbursed for the expenses entailed in modifying a mortgage. If securitization inhibited loan modifications in this way, then it may have exacerbated the financial crisis by increasing foreclosure rates, resulting in negative effects on housing prices and greater losses on delinquent loans. The existing empirical evidence on whether securitization led to frictions in loan renegotiation is mixed.²⁰

Another reason why securitization may have inhibited the mortgage modification process is that holders of different tranches of MBS may have competing interests. The most senior tranche may prefer that the servicer foreclose on a mortgage instead of modifying the mortgage because the proceeds from the foreclosure sale will be sufficient to pay the senior tranche. Getting paid may be considered particularly beneficial for the senior tranche holder in an environment where investors place a high premium on having cash in hand today.

However, after the proceeds from the foreclosure sale pay off the senior tranches, no money may be left for the junior tranches. Consequently, the junior tranche holders may prefer that the servicer offer a modification in lieu of foreclosure, in hopes of getting some payment if the borrower starts to pay on the mortgage again. In the face of these conflicts, the contract that the SPV has with the servicer sometimes imposes rules dictating when the servicer is to foreclose on delinquent borrowers. These rules may fail to maximize the total value from the pool of mortgages.

²⁰ Piskorski, Seru, and Vig (2009) find that, conditional on becoming seriously delinquent, loans held in portfolio have lower foreclosure rates than loans that are securitized. However, Adelino, Gerardi, and Willen (2009) show that servicers modify loans held in their portfolio at the same low rate as they modify securitized loans that they service.

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